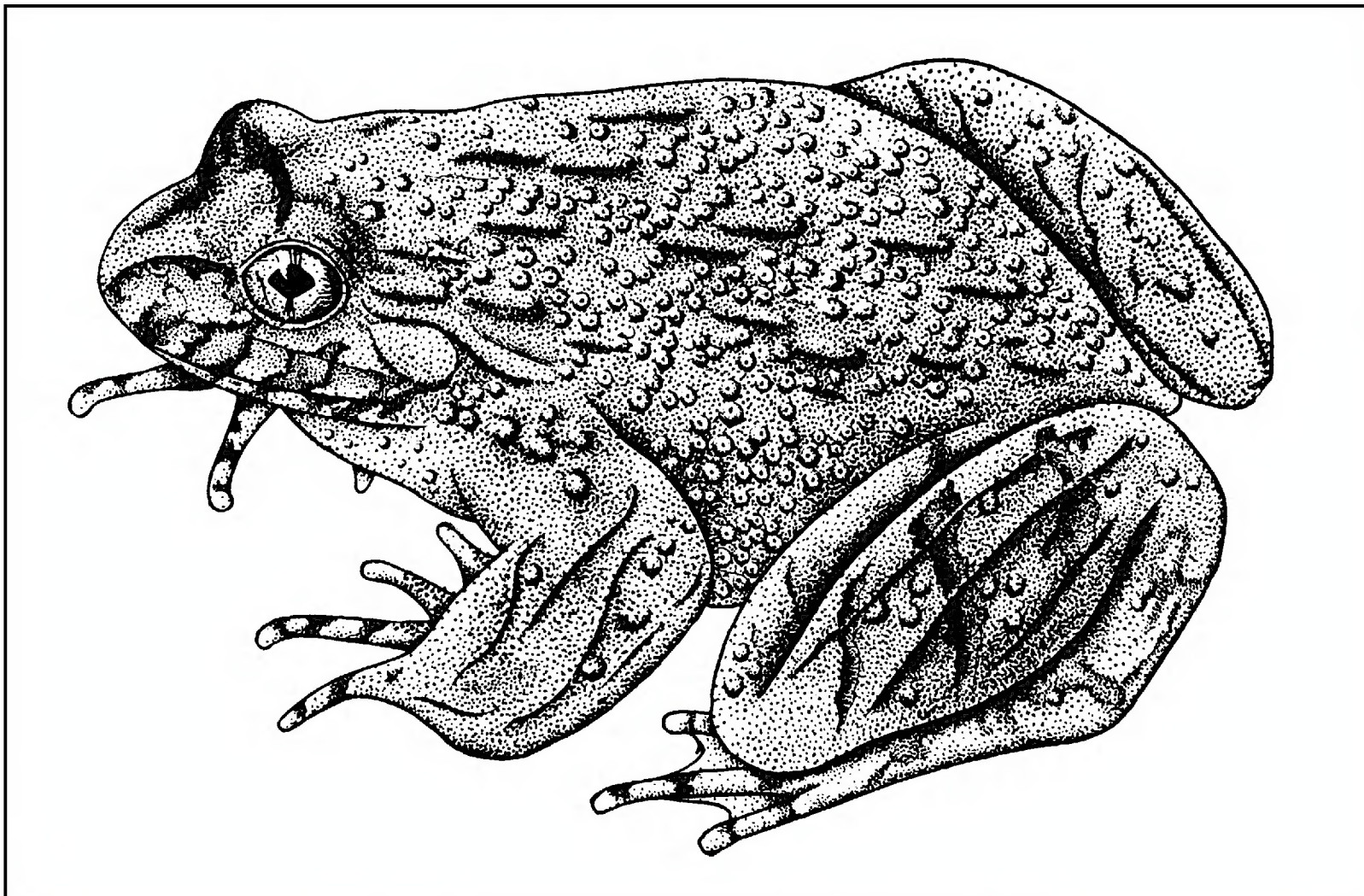

BULLETIN

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BULLETIN OF THE CHICAGO HERPETOLOGICAL SOCIETY

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Death Adders (<i>Acanthophis antarcticus</i>) Are Almost Certainly Not Part of Victoria's Snake Fauna	Raymond Hoser	125
Note on Reproduction of the Lined Earless Dragon, <i>Tympanocryptis lineata</i> (Squamata: Agamidae), from Australia	Stephen R. Goldberg	129
What You and I Missed at the July Meeting	John Archer	131
Herpetology 2009		132
Unofficial Minutes of the CHS Board Meeting, July 17, 2009		135
Advertisements		136
2009 Midwest Herpetological Symposium		136

Cover: Adult male spiny-bellied frog, *Quasipaa boulengeri*. Drawing (as *Rana boulengeri*) from *Amphibians of Western China* by Ch'eng-chao Liu, Fieldiana: Zoology Memoirs Volume 2, 1950.

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Death Adders (*Acanthophis antarcticus*) Are Almost Certainly Not Part of Victoria's Snake Fauna

Raymond Hoser
488 Park Road
Park Orchards, Victoria, 3114
Australia
adder@smuggled.com

Abstract

Evidence suggests that contrary to speculation on the part of many people, death adders (*Acanthophis antarcticus*) are not a part of the Victorian (Australia) fauna. This paper provides the factual evidence in terms of these snakes not being in the Australian state of Victoria.

Introduction

Death adders (genus *Acanthophis*) are unique among the family Elapidae in that their appearance and biological habits have evolved in a manner convergent with viperid snakes. The convergence includes the stout body, ambush predation as a feeding strategy and use of a caudal lure as part of their ambush predation (Chiszar et al., 1990; Hoser, 1995). In death adders the lure takes the form of a modified scale at the end of the tail terminating in a spine (see Carpenter et al., 1978). The tip of the tail is often of a different color from the rest of the snake, and may be white, cream, or black (see Hoser [1989] for photographic examples).

Death adders are found in all mainland Australian states except for Victoria (see below), including coastal islands off South Australia, Western Australia and northern Australia. Death adders also occur in New Guinea and islands west of there, and on some islands in the Torres Strait (see Hoser [1998, 2002]).

The species is not known from Victoria, although its occurrence has been suspected or speculated about along the northern border of the state, especially in the northwest and northeast. There are some isolated and unconfirmed records for Victoria, however the purpose of this paper is to suggest that the species may never have occurred in this state at any time since European settlement, or if so, then it is no longer in this state in any area.

The best known citations for death adders in this state are as follows:

- A line drawing by Gerard Krefft, of a specimen allegedly from Lake Boga, in the Murray Valley, northern Victoria. The drawing was made in 1856 in his diary and little is known of the basis for it. No suitable habitat for the species exists in the area and it's thought that if it was there in the first instance, then the population has long since been extinguished (see Coventry and Robertson, 1991). However, another very real possibility and one countenanced by myself is that the record may have been in error and/or the specimen may have originated from somewhere else. Evidence for this is the continued absence of the species from apparently suitable habitat west of this location in the Sunset Country National Park in Victoria.
- Another record of note is of an alleged specimen found on

Walpolla Island in the Murray Valley, northwest Victoria. No specimen was retained and the sighting was by Peter Menkhorst who said he identified the snake after checking in a relevant herpetological field guide. This claim is disputed on the basis of a lack of a specimen, no further specimens being found in the area, a general lack of suitable habitat for the species on the island and the fact that the species may be confused with others known to occur in the area, most notably tiger snakes (*Notechis*).

- There are regular news reports of death adders turning up in areas around Albury-Wodonga, along the Murray River. Within the five years to 2003 there was a report of one such snake in the local paper (*The Border Mail*) replete with a photograph of the said snake. The snake was merely a tiger snake (*Notechis scutatus*) and a very normal one at that. No records of death adders from the Albury-Wodonga area have checked out as true and based on the known habits of the species and the local habitat, which is totally unsuitable for the species, any claims of death adders in the area must be treated with the utmost skepticism.
- Coventry and Robertson (1991) speculate that the species may still be present in coastal heaths of far east Gippsland, as death adders are found in similar habitats on the southeast coast of New South Wales. This speculation is discounted here on the basis that the relevant areas near Genoa and Mallacoota are heavily collected by private herpetologists, including at least one who has lived in the area for some years (Clinton Logan) and yet no one has turned up any evidence of the species in Victoria. The closest known locations are coastal heaths north from about Eden, New South Wales (including as cited in Longmore [1986]), where these snakes are both common and commonly seen.
- Swan (1990) reports on a record in New South Wales from the Bondi State Forest (20 minutes drive south of Bombala, NSW) and within a short distance of the NSW/Victorian border. This record does not appear in Longmore (1986) and I have no knowledge of the basis for the record. While there is apparently suitable habitat for death adders in the area, the Bondi State Forest record and any others from the area must be doubted as the area is generally colder than other areas inhabited by the species, and by a significant margin, because of the altitude. The idea that these snakes are found in suitable habitats inland from coastal heaths that apparently lack the species also flies in the face of what is known about

the distribution of these snakes in places such as southeastern South Australia.

Notwithstanding the published records and speculation as given above, the known distribution of death adders in southeast Australia as of 2003 leads to the conclusion that death adders have not been in Victoria at any time since European settlement and probably for quite some time beforehand.

The basis of this conclusion can be seen from the distribution of these and other species of elapids, including species as well-known as tiger snakes (*Notechis*) and copperheads (*Austrelaps*) and a reconciliation of these known facts with other data such as climatic for southeast Australia.

Modern distribution of elapids in southern Australia

In the recent geological past (the last 20,000 years), Australia's climate has become progressively warmer. The result of this has been a receding of the distributions of cold-climate genera—species of snake such as tiger snakes (*Notechis*) and copperheads (*Austrelaps*).

In terms of tiger snakes, their distribution has become disjunct across southern Australia with the eastern and western populations becoming split as the Nullarbor Region of southern Australia has become too hot and dry for them. In Queensland at least one outlier population has formed at high altitude in the Canarvon region, being cut off from the others by a region of warmer lowlands.

For the copperheads a similar situation has occurred. The distribution in northern New South Wales, in the New England Tableland has become disjunct and restricted to cooler high-altitude locations. The Victorian population enters South Australia near Mount Gambier, then is cut off from the other population of copperheads in the Adelaide Hills and Kangaroo Island by an area of relatively warm lowlands.

Noting the stark differences between the regional variants of Copperheads in southern Australia, it appears that periods of warming and cooling in Australian climate have occurred at least twice over the recent millennia.

Geological records confirm the same in other parts of the world. Other cooler climate species (or genera) having their distributions broken up into disjunct populations include the rough-scaled snakes (*Tropidechis*) and the red-bellied black snakes (*Pseudechis*), whose Queensland populations have formed outliers in the montane areas.

Noting that the climate has warmed over the last 20,000 years, it is not surprising that cool climate species have tended to have their distributions decline and become fragmented. However in terms of warm climate species in southern Australia, the reverse has evidently been the case.

For king brown snakes (*Cannia australis*) the distribution appears to be more-or-less continuous extending southwards from warmer parts of northern Australia. Death adders also appear to have expanded their distribution southwards in the recent past in southern Australia and within their known present range, their distribution is effectively continuous (as befits a

species with an expanding range). This of course discounts the effects of the removal of habitat since European settlement. It is also notwithstanding the two known populations of *A. antarcticus* being themselves separated. These populations are the one in the eastern states, centered along the New South Wales and Queensland coasts and the other starting in South Australia from the Gulf of St. Vincent and extending west from the Eyre Peninsula, more or less continuously to the southwest of Western Australia.

That temperature has been the principal determinant of distribution is indicated by the distribution of the species in South Australia and New South Wales. In both states, the southernmost known populations tend to be found at or adjacent to coastal heaths that are protected from the cold by a moderating sea influence. In terms of South Australia, these snakes are found further south along the Gulf of St. Vincent on the warmer western side than on the cooler eastern side.

Using this criterion alone, the only likely places in Victoria that death adders could be found are in the far northwest or the far northeast along the coast. Both areas are heavily surveyed by reptile collectors and have not yielded death adders. It's also known that where these snakes occur, they do occur in large numbers are generally well-known by local inhabitants. As this is not the case for either part of Victoria, it must therefore be concluded that these snakes are not present in these regions.

In terms of northeast Victoria, the picture seems self-evident. The range of these snakes had not extended to the northeast of Victoria, even if in the recent past, the climate and other factors made the habitat suitable for them.

It is also worth comparing the death adders with a somewhat more mobile snake species that has also extended its range southwards in the recent geological past. The diamond pythons (*Morelia*) have only managed to just cross the NSW/Victorian border and are not found in areas of apparently suitable habitat further south. These snakes are also found in colder parts of the Blue Mountains in New South Wales than death adders (e.g., on top of the Newnes Plateau), which may also in part explain their distribution running further south than that of the death adders.

Another noteworthy variable is fire. Death adders are slow-moving and hence relatively unable to flee bushfires. Areas without hills, rocks or large gaps in vegetation are likely to burn totally if on fire and kill all or most death adders.

Throughout southern Australia, death adders tend to be found at or near areas that have refugia to fire and their distribution tends to reflect this fact. The range has tended to expand along coasts and ridgelines. Even as far north as Sydney, death adders are not found on the Cumberland Plain which as a natural habitat provides no refuges for these snakes during fires. They do however survive quite well in hilly and coastal areas with natural retreats from flames. The same situation is seen in the plains immediately west of Brisbane in the Ipswich region. The fire factor may also explain why death adders have been rare or absent in western New South Wales, even before the time of European settlement.

There are only a few records of the species from inland New

South Wales; all are very old and all are from hilly areas. However these snakes are known from inland areas of Queensland, where habitat was more heavily wooded in the pre-European period. The patchy distribution of death adders in the Darling River Basin appears to go against the idea of a warm climate species expanding its distribution. However if reconciled with the recent arrival of Aborigines (in the last 40,000 years) and a changed fire regime as a result, it seems likely that by changing the vegetation cover in these areas through fire and perhaps increasing numbers of certain grazing animals at different times, that death adders may well have found themselves in areas now made unsuitable for them. Hence they died out in this area and their distribution became patchy.

Death adders are relatively unusual among Australian snakes in that they cannot tolerate habitat modification and rely on a thick matting of leaves or other vegetation litter in order to survive. Areas heavily grazed by native or domestic animals are rendered unsuitable for these snakes and they die out. This may well explain the patchy distribution of these snakes in inland New South Wales and further north in inland Queensland in the time of immediate post-European settlement.

Why there are no death adders in northwest Victoria

In the far northwest of Victoria, in the region generally known as Sunset Country is a vast belt of habitat that is evidently suitable for death adders. The present-day climate appears to be warm enough for the snakes, as evidenced by their being found in similar parts of Western Australia. Furthermore the habitat appears to be optimal in that it has sandy or rocky soils, stunted gum trees, spinifex tussocks and so on.

In spite of these facts and the fact that the area is heavily collected by herpetologists, no death adders have turned up. That there are no death adders here is confirmed by a similar absence of these snakes in other areas of suitable habitat to the immediate north in New South Wales and to the immediate west in places like Renmark, South Australia, the latter being inhabited by the snake collecting Bredl family for many years. If death adders were there, the Bredls would have found them. Instead they used to travel to places like Whyalla on the Eyre Peninsula to get their stock.

The obvious question then is “Why no death adders?” Based on what’s already known about the local climate, it is reasonable to infer that the northwest of Victoria was not always suitable habitat for these snakes.

Furthermore the main basis for the claim that the area is now optimal habitat is the presence of more than one variety of spinifex (*Triodia* spp.) in the area. However what appears to have been missed by many commentators is how these grass species get to be in these areas. Most importantly, spinifex seeds are light and may be transported via the wind. During summer dust storms which occur most years, seeds and the like may be transported many hundreds of kilometers through the air before being deposited on the ground. By way of example, the entire northwest of Victoria is covered with reddish sandy soil (bulldust) to an average depth of some feet even though the locally occurring rock is white. The soil is blown in from cen-

tral Australia and parts of western New South Wales.

Hence, it’s obvious that in the recent geological past, spinifex has also been blown into these parts of Victoria. Spinifex can only grow in stony and sandy habitats; these grasses don’t grow on low lying river flats, floodplains, black soiled areas and other situations. In other words spinifex is able to jump vast areas of unsuitable habitat. Death adders can’t do this.

Even in areas of good habitat, death adders more than any other Australian reptile are known for one trait—not moving. Recent DNA studies on Western Australian *Acanthopis wellsi* and *A. pyrrhus* by Ken Aplin and Steve Donnellan (1999) and venom-related studies by Fry et al. (2001) on several species have indicated that even close populations have been separated for some time, indicating the lack of mobility for these snakes, even across short distances.

Additional evidence of the lack of mobility of death adders comes from their distribution in southern Australia. They are found on islands off the coast, including Revesby Island, South Australia, and others off the Western Australia coast, which have all been disconnected from the mainland in the last 12,000 years or less. In South Australia there is little evidence to suggest much expansion of the species’ range to the south since then, even though evidence suggests that the changes in the local climate could have facilitated a reasonable southward expansion of their range beyond that which we know exists.

Is the death adder rare in Victoria?

Finally there is the theory bandied about that because Victoria lies on the edge of the potential range for the death adder, that the species may be rare here and hence harder to find.

Worrell (1972) was one proponent of this theory. However there is no basis for it. In the southernmost parts of the known range for death adders—in places like Revesby Island and Ardrossan, South Australia—these snakes are particularly common and easy to find. In terms of the diamond python (*Morelia spilota*) a New South Wales species which also occurs on the Victorian side of the state border at Mallacoota, Genoa and nearby areas, it too is easy to find in these places, which happen to lie at the southern edge of the known range of the species.

By virtue of their ecology and habitats, it is fairly safe generalization that where death adders occur they are common. Even if not easy to find by collectors on a given day, these snakes are found if looked for enough and they are regularly seen, caught and identified by non-herpetologists. Once again, I note none have turned up in Victoria and hence the only inference can be that they are not here.

Also of note is that while much of Victoria’s habitat has been altered since European settlement, the two areas of likely habitat near the New South Wales border in the northwest and northeast are effectively unchanged and hence if they had death adders 200 years ago, they still would have. It is for that reason that old records and claims of death adders must be dismissed as either hoaxes or inaccurate.

The death adder in Victoria has become somewhat of a Holy Grail, in much the same way as the thylacine in mainland Aus-

tralia. It's become a status symbol to claim to know they are in the state or to have found one once. However the evidence of the species occurring in this state is absent and unless and until a population is identified here, the species should be regarded as being absent from the state's fauna now and at all other materially relevant times since European settlement of Australia.

Summary

The evidence of suitable habitat in Victoria for death adders cannot be taken as evidence of the snakes occurring in this state. The fact that none have been found in spite of extensive collecting of reptiles in the only areas of suitable habitat in the north-

west and northeast of the state must be taken as showing that death adders do not occur in Victoria. If the snakes were in Victoria, they would have been found and based on the size of the areas of apparently suitable habitat, could be collected at will.

The distribution of death adders in southern Australia has expanded in recent geological times, but had not yet reached Victoria at the time of European settlement. Since European settlement of Australia the possibility of the species expanding its range into Victoria has been removed, other than via a deliberate and planned introduction of specimens into an area. This is not foreseeable.

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Note on Reproduction of the Lined Earless Dragon, *Tympanocryptis lineata* (Squamata: Agamidae), from Australia

Stephen R. Goldberg
Biology Department, Whittier College
PO Box 634
Whittier, CA 90608
sgoldberg@whittier.edu

Abstract

Gonadal material from the lined earless dragon, *Tympanocryptis lineata*, from Australia was histologically examined. Based on the presence of males producing sperm in spring, a female from February (austral summer) that recently deposited an egg clutch and a neonate collected in January, I conclude this agamid species follows a spring–summer reproductive cycle, which is typical for other Australian agamids. Production of multiple egg clutches in the same reproductive season appears possible, but needs verification. The smallest reproductively active male measured 48 mm SVL.

Tympanocryptis lineata is an agamid lizard that occurs from eastern and southeastern Western Australia through the interior of all mainland states to the western slopes of New South Wales and southern Victoria (Cogger, 2000). Previous information on reproduction of *T. lineata* consists of clutch sizes of 9–11 eggs from January females reported by Ehmann (1992), 6 eggs from October by Heard et al. (2004) and various dates of occurrences of oviductal females (Greer, 1989). The purpose of this note is to add information on the reproductive biology of *T. lineata* from a histological examination of gonadal material from museum specimens. The first information on the testicular cycle of *T. lineata* is presented.

Eight *T. lineata* (six males, mean snout–vent length (SVL) = 53.7 mm $\pm$ 4.3 SD, range: 48–61 mm; one female (SVL = 51 mm) and one neonate (SVL = 22 mm) were examined from the herpetology collection of the Natural History Museum of Los Angeles County (LACM), Los Angeles, California. Lizards were collected 1966 and 1968 in South Australia between 28°57'S to 29°03'S and 134°19'E to 134°31'E and 1966 and 1967 in Western Australia between 18°23'S to 31°59'S and 125°44'E to 128°26'E.

The following *T. lineata* were examined from South Australia: LACM 55380, 55381, 57944 and Western Australia: LACM 55382–55386.

Gonads were dehydrated in ethanol, embedded in paraffin, sectioned at 5 μ m and stained with Harris' hematoxylin followed by eosin counterstain (Presnell and Schreibman, 1997). Histology slides were deposited in LACM.

Three stages were recorded in the testicular cycle: (1) Late Recrudescence, just prior to spermiogenesis in which spermatids and occasional metamorphosing spermatids, but no spermatozoa line the seminiferous tubules. This condition was recorded in one October male. (2) Spermiogenesis (= sperm formation) in which the seminiferous tubules were lined by spermatozoa and/or clusters of metamorphosing spermatids. This condition was recorded in males from November ($n = 3$) and January ($n = 1$). (3) Late spermiogenesis was recorded from one male from January in which the germinal epithelium was reduced to 5–7

cell layers and limited amounts of sperm were still being produced. While this indicates the period of sperm production is ending for this lizard (LACM 55386), histological examination of testes from additional austral summer males are needed to verify the duration of the *T. lineata* period of sperm production. The smallest reproductively active male (late recrudescence) measured 48 mm SVL (LACM 55383).

The one adult female examined from February measured 51 mm SVL (LACM 57944) and contained a corpus luteum indicating a clutch of eggs had recently been deposited. Ovarian follicles in this female were not undergoing yolk deposition for a subsequent clutch.

One neonate (SVL = 22 mm) was collected in January (LACM 55384). The finding of a neonate on this date and a February female that had recently deposited eggs suggests there might be sufficient time for production of two egg clutches in the same reproductive season. Greer (1989) reported *T. lineata* females with oviductal eggs from various localities: late September, October and early March which lends support that there is adequate time for production of two egg clutches.

The timing of sperm production in *T. lineata* during austral spring and egg deposition in February as indicated in this paper is in accordance with the findings reported in Greer (1989) and Greer and Smith (1999) that Australian agamid reproduction is centered in austral spring–summer which is typical of Australian temperate lizards, in general. *Tympanocryptis lineata* appears to fit the Type I category of spring spermatogenesis and mating and spring ovulation of Heatwole and Taylor (1987).

The exact number of egg clutches produced by *T. lineata* in the same year will require examination of additional females. Also, samples from different populations in the broad distribution of *T. lineata*, merit investigation to determine the extent of geographic variation in its reproductive cycle.

Acknowledgment

I thank Christine Thacker (LACM) for permission to examine *T. lineata*.

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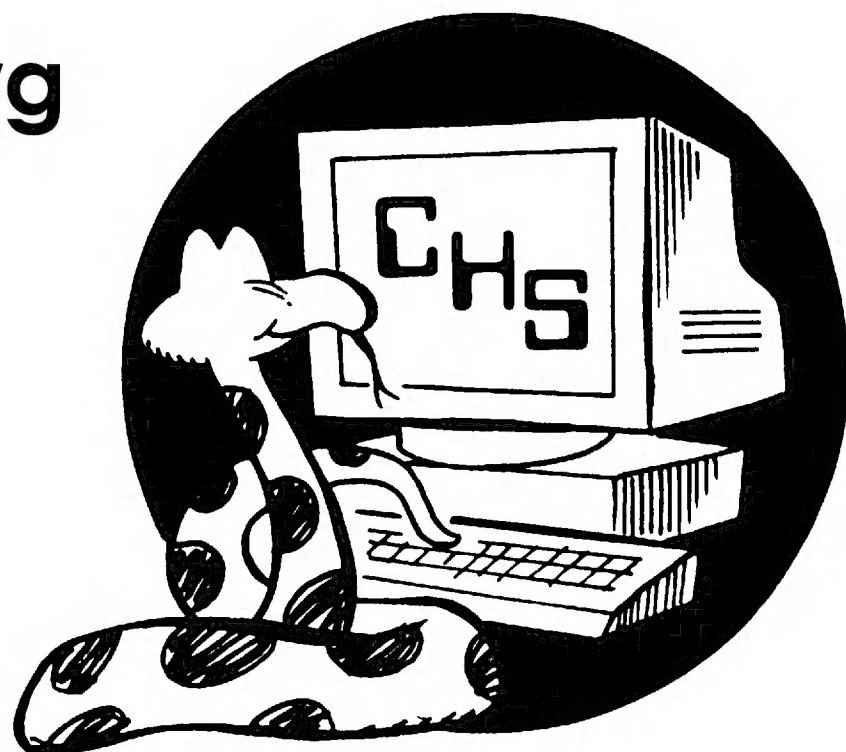
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What You and I Missed at the July Meeting

John Archer
j-archer@sbcglobal.net

Much to my disappointment, I missed the July meeting. Our speaker was Kate Jackson, assistant professor of biology at Whitman College in Walla Walla, Washington. If I lived in Walla Walla, Washington, I'd take every opportunity to say the name of that city. It's just too much fun to say. But I digress (I've always thought that sounds better than "I'm wandering.") At my age, I do way too much of that. Wait! I'm digressing again!) The title of her presentation was the same as the title of her book, *Mean and Lowly Things: Snakes, Science, and Survival in the Congo*. Since I missed the lecture, I decided to read her book and do a little research and maybe write a book review. Well the book review has been done, and done better than I could have done it, by Rebecca Christoffel in the December 2008 issue of the *Bulletin*. Rebecca liked it and recommended it. I do too.

I don't know if there is a stereotypical look for the adventurous individual, but I'm sure that Kate Jackson does not fit the first image that pops into my head. A short, slender woman with what sounds to me like a slight British accent (you can hear an interview with her at NPR.org or a 42-minute interview at WICN.org), Dr. Jackson attended Toronto University for her undergraduate and master's degree and Harvard University for her doctorate. Along the way she did stints at the Smithsonian working with their herpetological collection. She's been interested in snakes for as long as she can remember and that interest, a desire to study in one of the world's least explored areas and ambition that would shame most of us, led her to the Republic of Congo, the smaller, less stable, much less populated,



Speaker Kate Jackson, behind the podium, gets a chance to chat before the meeting with Donna Gustafsson, president and CEO of the Notebaert Nature Museum.

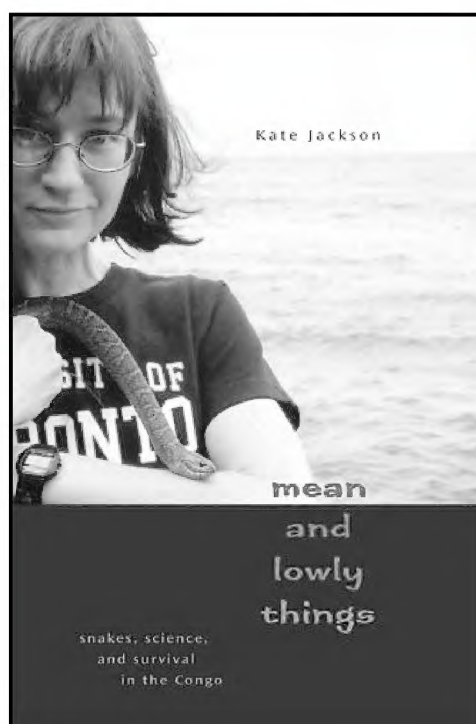
western cousin of the Democratic Republic of the Congo. Since she couldn't seem to join a large, well-funded expedition, she arranged her own expedition, an expedition of one.

This book is required reading for anyone who is planning a scientific expedition to any developing (or not-so-developing) country. It is required reading for anyone who thinks that one person cannot fight the bureaucracy. And it's required reading for anyone who has ever doubted they have the abilities needed to achieve their goals. I think that I would like Kate, but I'm equally certain that not everyone does.

She writes about events and people in an uncompromising and frequently intolerant way, but she writes about herself in the same manner. I know that this book would not teach me enough to plan my own expedition, but I suspect reading it would help me avoid many mistakes.

Dr. Jackson includes maps of the Congo and pictures of nearly all the animals mentioned in the book, which allowed me to better experience her trials. I'm really sorry not to have met her. Read the book. You'll like it.

As an aside, which is not the same as digressing, I've started to send out occasional emails that give some idea about what your society is doing and items that may be of interest. I keep them short. If you have something that you think might be included, please let me know. If you don't wish to receive them (we all get too many emails), let me know. If you're not getting them and want them, first check your spam filter, then let me know. Hope to see you at the next meeting!



Herpetology 2009

In this column the editorial staff presents short abstracts of herpetological articles we have found of interest. This is not an attempt to summarize all of the research papers being published; it is an attempt to increase the reader's awareness of what herpetologists have been doing and publishing. The editor assumes full responsibility for any errors or misleading statements.

WATERSNAKES IN URBAN ENVIRONMENTS

A. Pattishall and D. Cundall [2009, *Herpetologica* 65(2): 183-198] examined habitat use in a population of watersnakes with equal access to urban and natural habitats to test the hypotheses that species occupy urban environments either by (1) restricting their activities to any remaining natural areas, or (2) capitalizing on, instead of avoiding, artificial features. For three years the authors radio-tracked 50 northern watersnakes (*Nerodia sipedon*) living in a 40-ha area along 2 km of a city stream in Pennsylvania. Half the study site is urbanized (municipal park and an active industrial area), and half is a relatively natural conservation area. Habitats selected by snakes in the two areas were significantly different: in the natural half, snakes occupied areas with a wide riparian zone and dense canopy cover; in the urban half, they frequently used artificial substrates and were in close proximity to people. Snakes were relocated 2520 times, yet were found at only 113 sites. Frequently reused sites were mostly artificial, including piles of scrap metal or concrete, holes in a railroad bed adjacent to the stream, and dead evergreen trees secured into the stream bank to combat erosion. Urban and natural areas were approximately equal in area and stream length, and had similar numbers of snake-selected sites (64 urban, 49 natural), but urban sites were used by more snakes. Of sites used by more than five different snakes, 22 of 26 were in the urban area. Snakes were found within 5 m of a tagged conspecific at 38% of urban area relocations compared to 15% of natural area relocations. These data suggest that anthropogenic structures in urban environments provide conditions (concealment, thermal) that offset dangers posed by closer proximity to people.

EARLY EXPERIENCE CHANGES FROG CALLS

B. Dawson and M. J. Ryan [2009, *Copeia* 2009(2):221-226] note that anurans have long been a model system for studies of animal communication, but little is known about how individuals acquire acoustically linked mating behaviors. The manner in which behaviors are acquired may be a source of variation in these behaviors. In this study, *Physalaemus pustulosus* were reared in four acoustic treatment groups: hearing a conspecific chorus of *P. pustulosus* frogs; acoustically isolated from all frog calls; hearing a chorus of the congener *P. enesefae*; and hearing noise. Spectral and temporal characteristics of the calls produced by males were then measured and tested for differences between treatment groups. Males reared in isolation produced calls that were shorter in duration. Females showed discrimination against these shorter calls. Early experience can alter the advertisement call of male *P. pustulosus*, and acoustic isolation leads to the acquisition of calls that are less attractive to females. Males reared in other groups produced species-typical calls. The calls of male *P. pustulosus* may be the product of a gene by environment interaction.

GARTERSNAKE TOOTH STRUCTURE

E. J. Britt et al. [2009, *J. Herpetology* 43(2):252-259] examined morphological variation in tooth structure in four populations of gartersnakes (genus *Thamnophis*) with diverse feeding habits and tested the hypothesis that morphological homoplasy evolved in the malacophagous predators *Thamnophis ordinoides* and *Thamnophis elegans terrestris*. Although long, slender teeth are typical in Neotropical colubrid snake species that prey on slugs and snails, this morphological feature did not occur in *T. ordinoides* and *T. e. terrestris* relative to closely related gartersnakes (the diet generalist *Thamnophis elegans elegans* and piscivore *Thamnophis couchii*). However, the authors did find pronounced posterior ridges located on the posterior maxillary teeth in the two slug predators but not in the generalist feeders. The evolutionary origin and functional advantage of these ridges has yet to be identified. The fish specialist *T. couchii* has many morphological features characteristic of adaptations for piscivory, such as long, sharper teeth and elongated mandible bones.

DUSKY RATTLESNAKE DIET

E. Mociño-Deloya et al. [2008, *The Herpetological Bulletin* 105:10-12] report observations of the summer diet of the Quere-taran dusky rattlesnake, *Crotalus aquilus*, from an agricultural region near San Pedro de los Metates, municipality of Acambay, state of México, Mexico. The authors recovered the remains of 12 individual prey items from 11 different snakes. Eleven of 38 (29%) snakes observed contained prey remains, including 6 mammals, 3 lizards, and 3 snakes. These observations suggest that *C. aquilus* consumes a diverse diet and that they may be more ophiophagous than many other rattlesnakes.

GREEN SEA TURTLE NESTING BEHAVIOR

D. A. Pike [2009, *Chelonian Conservation and Biology* 8(1):43-47] notes that recent evidence suggests that higher sea-surface temperatures are affecting nesting patterns in loggerhead turtles (*Caretta caretta*), specifically by causing nesting to begin earlier in years with higher oceanic temperatures. The author tested whether a sympatrically nesting species (*Chelonia mydas*) also shows the same pattern and found that green turtle seasonal nesting patterns at Canaveral National Seashore, Florida, were unrelated to environmental temperatures at the nesting beach; although, the date of the first nest predicted the magnitude of the nesting season (nesting earlier in the year led to higher numbers of nests). Although the reasons for differences in loggerhead and green turtles remain unclear, these results indicate that the timing of loggerhead turtle nesting may change in a warming environment; whereas, green turtle nesting may remain relatively fixed with regard to temperatures at the nesting beach.

CONTROVERSY OVER LISTS OF SPECIES NAMES

G. B. Pauly, D. M. Hillis and D. C. Cannatella [2009, *Herpetologica* 65(2):115-128] provide a “Point of View” about taxonomic freedom and the role of official lists of species names. They note that the sixth edition of the *Scientific and Standard English Names of Amphibians and Reptiles of North America* (Crother, 2008, SSAR Herpetological Circular 37:1–84) is the “Official Names List” for the three major North American herpetological societies. They argue that, although this publication is intended to aid users of scientific and common names, current practices for authoring, reviewing, and using this list, in some cases, generate taxonomic chaos. By this they mean that users are uncertain of which name to use and/or the rationale for using a particular name, and efficient communication is hindered by this confusion. Most importantly, through inadequate and inconsistent review of this list, the societies have endorsed unnecessary and arbitrary name changes and are uncritically promoting individual taxonomic viewpoints when a clear choice on the most appropriate name has not been reached by the community. This problem is exemplified by North American anurans for which 57 of the 100 species have scientific names (i.e., genus-species combinations) different from the previous version of the list. Forty-eight of these new combinations result from changes to the genus name, and there is controversy over the proposed genus names for at least 43 of these. Despite this controversy and that a stated goal of the list is to report on such controversies, the alternative names are not discussed. As a result, for these taxa, the list fails to provide adequate information for users to make informed decisions on name usage. The authors examine the role of such lists in taxonomy. Although they specifically focus on the arbitrary changes to the names of North American *Bufo* and *Rana*, the authors maintain that continuation of current practices for generating the list will promote instability and taxonomic confusion on a broader scale. They conclude with recommendations for improving the utility of such lists and for avoiding unnecessary taxonomic chaos.

B. I. Crother [2009, *Herpetologica* 65(2):129-135] notes that standard names lists of the North American herpetofauna have been published since 1882, with the newest list published in 2008. Crother responds to the “Point of View” by Pauly et al. (see above). Specifically, Pauly et al. question the function and review process of such a list, the stability of scientific names, and the authority of the list, with an unfavorable conclusion for those involved in authoring the list. Crother provides counter arguments to the controversial points raised by Pauly et al. and poses the question: “Which is a greater impediment to taxonomic freedom of scientific names, imposed taxonomic stability or the nonexistent authority attributed to the list?”

D. R. Frost, R. W. McDiarmid and J. R. Mendelson III [2009, *Herpetologica* 65(2):136-153] respond to the “Point of View” by Pauly et al. and contend that it misrepresents the motives and activities of the anuran subcommittee of the Scientific and Standard English Names Committee, contains a number of misleading statements, omits evidence and references to critical literature that have already rejected or superseded their positions, and cloaks the limitations of their nomenclatural approach

in ambiguous language. The Pauly et al. “Point of View” is not about promoting transparency in the process of constructing the English Names list, assuring that its taxonomy is adequately reviewed, or promoting nomenclatural stability in any global sense. Rather, their “Point of View” focuses in large part on a single publication, *The Amphibian Tree of Life*, which is formally unrelated to the *Standard English Names List*. Finally, Frost et al. accuse Pauly et al. of promoting an approach to nomenclature mistakenly asserted by them to be compatible with both the *International Code of Zoological Nomenclature* and one of its competitors, the *PhyloCode*.

UNISEXUAL SALAMANDERS IN THE NORTHEAST

J. P. Bogart and M. W. Klemens [2008, American Museum Novitates 3627] note that several species of mole salamanders in the genus *Ambystoma* are targeted by various state, provincial, and federal agencies for conservation. These salamanders have specific wetland and forested upland habitat requirements that render them vulnerable to environmental alteration. The blue-spotted salamander, *Ambystoma laterale* (LL) and the Jefferson salamander, *A. jeffersonianum* (JJ) have both been listed for protection in various parts of their ranges, but the identification of these salamanders is confusing because they often coexist with unisexual individuals that are mostly polyploid and use the sexual species as sperm donors. The authors used isozyme electrophoresis, blood erythrocytes, and chromosome counts in a continued effort to identify sexual and unisexual individuals in eastern North America. They examined 1377 salamanders from 118 sites in Connecticut, Massachusetts, New Jersey, New York, Pennsylvania, and Virginia. Most Pennsylvania salamanders were *A. jeffersonianum* (JJ) but *A. laterale* (LL), previously unknown from Pennsylvania, were found in that state. The two sexual species were never found together. Diploid (LJ), triploid (LLJ; LJJ), and tetraploid (LLLJ; LJJJ; LLJJ) unisexuals were found. At most collecting sites, unisexuals were more numerous than sexual individuals. The association of sexual and unisexual individuals support a kleptogenic reproductive system in which the unisexuals steal genomes from their sympatric sexual sperm donors.

HERP SURVEY OF A UNIVERSITY'S CAMPUSES

A. A. Ibrahim [2008, *The Herpetological Bulletin* 105:1-9] carried out a herpetological survey on campuses of the Suez Canal University (SCU) located in the Suez Canal zone (Port Said, Ismailia and Suez) and North Sinai (Al-Arish). Research Center in St. Catherine and the university rest house at Sharm Ash-Sheikh, both in southern Sinai were also checked. Twenty-one herpetofaunal species were recorded during the period 1999–2007, including two amphibians and nineteen reptiles (14 lizards and 5 snakes). The largest number of species was recorded on the campus of Al-Arish, comprising one toad and 12 reptile species. This was followed by the number of herpetofauna inhabiting the Ismailia campus. Distribution of amphibians and reptiles on campuses of the SCU according to habitat was analyzed. The impact of the change in campus structure on the herpetofaunal community is also discussed.

TURTLESHELL TRADE IN TAIWAN

T.-H. Chen et al. [2009, *Chelonian Conservation and Biology* 8(1):11-18] report that based on customs trade statistics from 1999 to 2008, a total of 1989 metric tons of shells of hard-shelled chelonians have been imported into Taiwan for consumption in the traditional Chinese medicine (TCM) market, with an average of 198.9 metric tons/y. The total amount of soft-shell turtle shells imported was 290 metric tons, averaging 29.0 metric tons/y. This volume indicates that millions of turtles and tortoises have been killed annually for the TCM market in Taiwan alone. The trade of turtle shells for TCM has existed in huge volumes for a long time, with no significant decrease in the market size through Convention on International Trade in Endangered Species of Wild Fauna and Flora listing of the main target species. Although the customs trade records were not species-specific, in the market survey conducted in 1996–2002, a total of 39 species of turtles and tortoises, mainly originating from China, Southeast and South Asia, were identified. Only 3 non-Asian species were found. The larger number and numerous species of origin in turtle-shell trade for the TCM market indicate blatant disregard by traders for law and authority of responsible agencies from both source and consumer countries. Observed levels of usage and trade of turtle shells appear to be highly unsustainable and may have a great impact on the chelonian fauna in source areas. For the sustainability of chelonian fauna in Asia, clear policies and close international cooperation for the regulation of turtle-shell trade are urgently needed.

EFFECTS OF PRESERVATION ON LIZARDS

B. Vervust et al. [2009, *Amphibia–Reptilia* 30(3):321-329] note that the millions of preserved biological specimens in natural history museums across the world constitute a capital of biological information that is becoming increasingly accessible to students of various disciplines. Most students have taken measures of body size and shape of preserved museum specimens to test various elements of ecological and evolutionary theory. One possible hazard of using morphological measurements of museum specimens is that fixation and preservation may deform bodies or body parts, but most researchers implicitly assume that the such distortions are not large enough to jeopardize their analyses. This study measured 17 morphological variables on a set of 65 green iguanas (*Iguana iguana*), starting shortly after their death and then repeatedly over a two-month period, a period during which they were fixated and preserved. The aims of the study were (1) to quantify and compare the deformation in different morphometrics frequently used in evolutionary studies; (2) to determine the amount of temporal variation that can be attributed to reader variability; and (3) to build conversion equations that should improve the reliability of morphological comparisons of live and preserved specimens. Preserved lizards revealed major reduction in snout–vent length and body weight. Changes in other measured traits are more subtle, but persistent. These facts disturb analyses when using relative measurements, especially when comparing (often small) intraspecific differences or even morphological differences within populations in a temporal frame. The authors urge caution in using museum specimens as direct proxies for living organisms in ecological and taxonomic studies.

ST. PAUL'S ISLAND WALL LIZARD

A. Sciberras and P. J. Schembri [2008, *The Herpetological Bulletin* 105:28-34] note that the population of the endemic Maltese wall lizard, *Podarcis filfolensis*, on the small island of Selmunett (10.9 ha), off the northeast coast of the island of Malta, has been described as a distinct subspecies *P. f. kieselbachi*. Selmunett is a protected site and its lizard is a protected species. Reports of a pronounced decline in the Selmunett lizard population were investigated by systematic visual estimates of lizard population density started in 1999. Since August 1999, population counts declined from a high of 18 individuals observed per hour to zero by August 2005. The rate of decline was greatest for juveniles and females. Numerous cases of predation of the lizards by rats were observed and such predation seemed to be the cause of the decline in lizard population; visual counts of daytime-active rats, also started in 1999, showed a large rat population on Selmunett. In turn, the rat population appeared to have increased as a result of organic waste left by human visitors to the islet. A rat eradication programme implemented in 2006–2007 exterminated rats from Selmunett by the summer of 2007, when a few lizards captured in 2004 and kept in captivity since were released back on the islet to augment what remained of the population there (some lizards were spotted by casual observers, even though none were recorded during the actual counts). It remains to be seen if this attempt at saving the Selmunett wall-lizard population has been successful.

OLIVE RIDLEYS AT NANCITE BEACH

L. G. Fonseca et al. [2009, *Chelonian Conservation and Biology* 8(1):19-27] report that although the olive ridley sea turtle (*Lepidochelys olivacea*) is the most abundant sea turtle in the world, the species has exhibited a significant decrease in the size of arribadas at Nancite Beach, Costa Rica, since its discovery in 1970. In this study, the authors compiled previous data on number of nesting females per arribada for the period 1971–1997 and collected new data using a total count methodology and a strip transect method for the arribadas during 1999–2007. They used generalized additive models to assess the trend of arribada size for the period 1971–2007. The data indicate a significant reduction of 42%, 84%, and 90% in the number of nesting females per arribada in the periods 1971–1984, 1971–1992, and 1971–2007, respectively. Although they could not determine the specific reasons for this attrition the authors speculate that this decline may be driven by embryo-associated mortality due to a poor nest microenvironment in this beach. The data confirm that the Nancite arribada population has undergone a significant decrease over the past 36 years but that the population currently appears to be at a stable low point. In addition, the data show that hatchling production may be increasing at this beach, which suggests the possibility that this population may recover over a few decades. The significant attrition observed in this study underscores the ephemeral nature of arribada populations in general and the need for the continued monitoring of the Nancite population.

Unofficial Minutes of the CHS Board Meeting, July 17, 2009

The meeting was called to order at 7:38 P.M. at the Schaumburg Public Library. Board members Dan Bavirsha, Rick Hoppenrath, Deb Krohn, Brad Trost and Jenny Vollman were absent.

Officers' Reports

Recording Secretary: Cindy Rampacek read the minutes of the June 12 board meeting to the board. Minor corrections were made, and the minutes were accepted.

Treasurer: Andy Malawy presented the June financial reports and no questions were raised.

Membership Secretary: Mike Dloogatch confirmed that membership did increase for the June mailing. Memberships due to expire this month were shared

Publications Secretary: Aaron LaForge reported that the online registration sign-up form for the Midwest Herpetological Symposium is online and active. CHS membership form should be done with in a few days. Vet List is on the back burner for now with MHS taking the front seat.

Sergeant-at-arms: In Dan Bavirsha's absence, John reported that 51 were in attendance at the June 24 general meeting.

Committee Reports

Shows:

- Notebaert picnic, July 26, Dick Buchholz and Rick Hoppenrath will cover this event.
- Reavis High School show was cancelled.
- SEWERFest, August 2, Racine, Wisconsin.

Adoptions: Linda reports amazing numbers of red-eared sliders. She is also rehabbing a box turtle that has various issues. Also there are a pair of leopard tortoises coming in.

Old Business

Symposium 2009: Website is going great. We now have Jeff Lemm, Greg O'Connell, Zoltan Takacs, Kevin Fitzgerald, Bob Henderson all confirmed as speakers. We need three more. We have also added a map to the website to show how close we are in location to the Tinley Park NARBC event.

New Business

Collaboration: The Global Alliance of Artists has expressed an interest in working with the CHS conservation issues. They are willing to post opportunities for artists to assist with conservation work. Linda will make contact to see exactly what they have in mind.

Job opening: ZooMed is looking to fill a Midwest on-the-road sales rep position. John Archer has details.

Bob Pierson has completed a book on dwarf crocodilians and he is looking for someone to edit and proof the book. He looking for a professional editor.

Round Table

Nancy spoke to Oscar Newman, a CHS member who moved in across the street from her, and whom she had never met before.

Mike brought up the salamander species discovered in the Georgia foothills that is a new genus. Bill Peterman, who discovered the first specimen received a 2007 CHS grant to study salamanders in the southern Appalachians.

Aaron reminded everyone about SEWERFest.

Bob got a snapping turtle from Lake Michigan. It was their first snapper from a Great Lake!

Rich has had two rescues in the past month, both were from drug houses.

Dick is writing a memorial tribute to Lee Watson. If anyone has anything to share, please contact Dick.

Jason didn't say a whole lot, but out of his bag he pulled a few of his 11 black-headed python babies. . . . The eggs were pretty rough for the last month, and he was very happy they hatched. The prettiest was also the last to hatch.

The meeting adjourned at 8:56 P.M.

Respectfully submitted by recording secretary Cindy Rampacek



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For sale: Rats—live or frozen. I breed rats for my collection of boas so only top quality lab chow and care will do, I'm now offering surplus animals for sale. Located in far south suburbs of Chicago. Only orders of 20 or more please, no large rats will be available. For current availability and prices, please e-mail Steve at smuys@sbcglobal.net.

For sale: books. *Aspectos Basicos Sobre Las Serpientes de Costa Rica* by Mora, Alvarado, Bien and Lopez, 1996, 58 pp., 19 color photos of venomous snakes, also deals with antivenin production and snakebite treatment, in Spanish; several pages stuck together (s), \$22; *The Denver Zoo—A Centennial History* by Carolyn and Don Etter, 1995, 237 pp., over 250 color and b&w photos, first comprehensive history of one of America's oldest zoos, DJ, (h), \$22; *Thylacine: The Tragedy of the Tasmanian Tiger* by Eric Guiler, 1985, 207 pp., b&w photos, tables, range maps, the history of the thylacine from fossils through to present day by noted authority, DJ, an as-new copy of this scarce work, (h), \$375; *Australian Reptiles & Frogs* by Raymond T. Hoser, 1989, 238 8½ × 11½" pp., 631 color photos of herps and their habitats, range maps, bibliography, info on captive husbandry, conservation, reptile photography; DJ, (h), \$135; *Reptiles of South Australia—A Brief Synopsis* by T. F. Houston, 1973, 11 pp., 24 color photos, South Australia has about 160 species of reptiles, (s), \$12. h = hardbound; s = softbound. All books in excellent condition except as noted \$3 postage and handling for orders \$25 and under; free for orders over \$25. William R. Turner, 7395 S. Downing Circle W., Centennial, CO 80122; telephone (303) 795-5128; e-mail: toursbyturner@aol.com.

For sale: Will soon have Malagasy cat-eyed snakes, *Madagascarophis*, four clutches, total of 24 eggs, all looking good. These are from several females of different colors. We were not able to get locality data on the adults. All are long-term and several young are over a year old. Asking \$200 each or \$250/pair. If interested, call Dave at (903) 769-9314. I will return any and all calls as soon as possible.

Herp tours: Adventure trips to **Madagascar!** Journey somewhere truly unique to seek and photograph nature on the world's least-studied mini-continent. For maximum herp fun and discovery, join Bill Love as we go where few people will ever venture in their lives. Let his experience assure a comfortable tour finding the most colorful and bizarre species on the planet! Get all the details at Blue Chameleon Ventures' comprehensive new website: <<http://www.bluechameleon.org>>, E-mail: bill@bluechameleon.org, or call (239) 728-2390.

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2009 MIDWEST HERPETOLOGICAL SYMPOSIUM

This year is the Chicago Herpetological Society's turn to host the Midwest Herpetological Symposium. Those of you who have been around for a few years probably know what the MHS is, but for those who don't, it's an annual gathering of people interested in herpetology to listen to entertaining and informative speakers, an opportunity to meet and interact with your peers, and a continuation of your society's mission to educate and encourage cooperation between professional and amateur herpetologists. Toward that end we gather an outstanding list of speakers, host a nice icebreaker on Friday night, and a banquet and auction on Saturday night.

The event will take place October 9–10 at Georgio's Comfort Inn in Orland Park, Illinois. That is the same weekend as the NARBC show in Tinley Park and our hotel is less than ten minutes away from the show. Register before August 31 and the symposium costs \$75; after that it costs \$85. The banquet is optional and costs an additional \$35. All MHS registrants will be able to attend the NARBC show on Sunday for only \$5. Rooms at the Comfort Inn will be \$94.99 (MHS rate).

Friday night's icebreaker will include short presentations by CHS members **Dr. Steve Barten**, a veterinarian specializing in herp medicine and a great photographer, and **Mike Pingleton**, author and another great photographer. On Saturday we will feature: banquet speaker **Dr. Kevin Fitzgerald**, who appeared on Animal Planet's Emergency Vets for ten seasons and is a professional stand-up comic; **Bob Henderson**, senior curator of herpetology at the Milwaukee Public Museum, with tales of his years working in the West Indies; **Jeff Lemm**, herpetologist at the San Diego Zoo's Institute for Conservation Research, talking on the herps of San Diego county; **Bill Peterman**, a doctoral candidate at the University of Missouri, on his role in the discovery of the first new genus of amphibian described from the U.S. in nearly 50 years; **Gregory McConnell**, professor of biology at Emory and Henry College, speaking on the biodiversity of Costa Rica; **Zoltan Takacs**, star of "Snake Wranglers: Swimming with Seasnakes," on how the cobra escapes its venom; and more speakers to come.

Food, speakers, entertainment, discount admission, companionship, story telling, and liquid refreshments for a very low price. You can't afford not to come. A registration form is included in this *Bulletin* or can be found on the CHS website.

UPCOMING MEETINGS

The next meeting of the Chicago Herpetological Society will be held at 7:30 P.M., Wednesday, August 26, at the Peggy Notebaert Nature Museum, Cannon Drive and Fullerton Parkway, in Chicago. **Dr. Mark Mitchell**, associate professor in veterinary clinical medicine at the University of Illinois, Urbana-Champaign, will speak about his research into the effects of ultraviolet light on snakes and turtles. Dr. Mitchell is past president of the Association of Reptilian and Amphibian Veterinarians and currently scientific editor of that society's *Journal of Herpetological Medicine and Surgery* and editor-in-chief of the *Journal of Exotic Pet Medicine*.

At the September 30 meeting **Dr. Kathryn Tosney** will speak on "How Human Selective Breeding Has Changed Australian Bearded Dragons." Dr. Tosney spent many years on the faculty at the University of Michigan in Ann Arbor, and is a long-time member of the Michigan Society of Herpetologists. She is now professor of biology and chair of the Biology Department at the University of Miami in warm and herp-rich Florida.

The regular monthly meetings of the Chicago Herpetological Society take place at Chicago's newest museum—the **Peggy Notebaert Nature Museum**. This beautiful building is at Fullerton Parkway and Cannon Drive, directly across Fullerton from the Lincoln Park Zoo. Meetings are held the last Wednesday of each month, from 7:30 P.M. through 9:30 P.M. Parking is free on Cannon Drive. A plethora of CTA buses stop nearby.

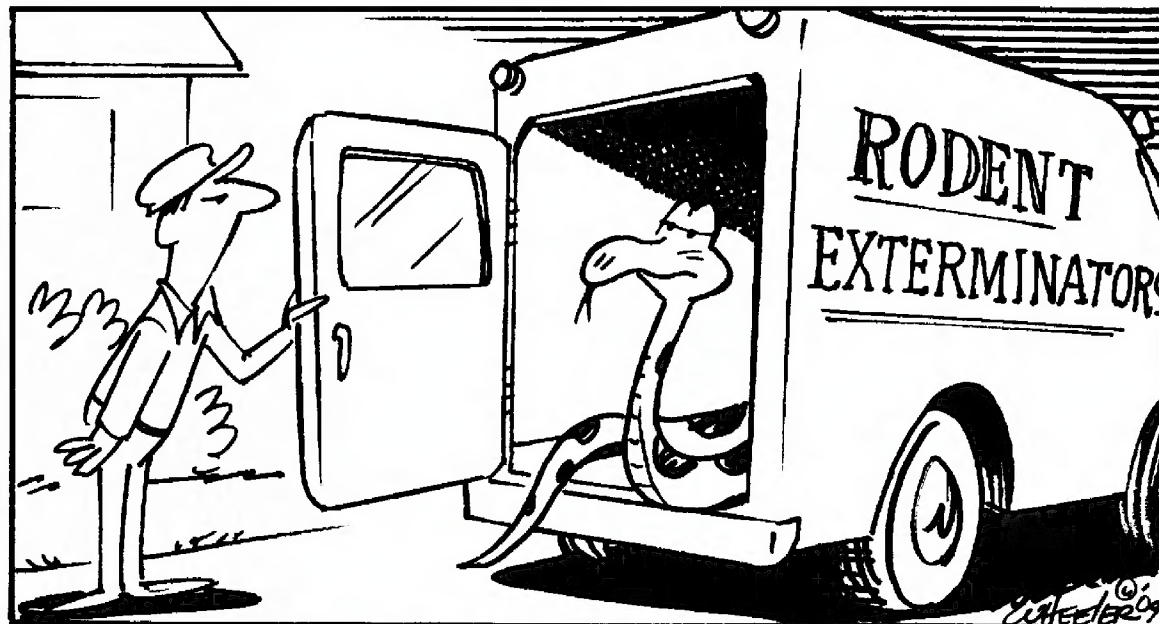
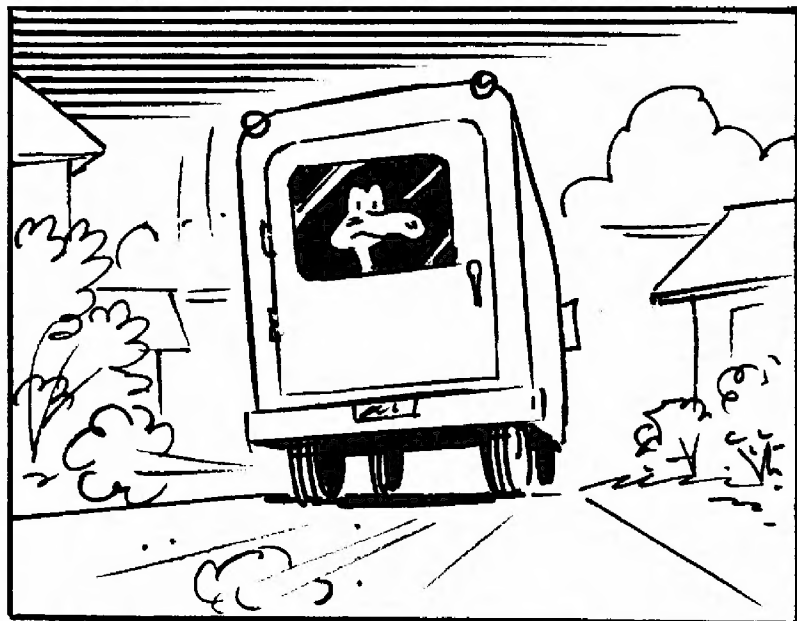
Board of Directors Meeting

Are you interested in how the decisions are made that determine how the Chicago Herpetological Society runs? And would you like to have input into those decisions? If so, mark your calendar for the next board meeting, to be held at 7:30 P.M., September 18, in the adult meeting room on the second floor of the Schaumburg Township District Library, 130 S. Roselle Road, Schaumburg.

The Chicago Turtle Club

The monthly meetings of the Chicago Turtle Club are informal; questions, children and animals are welcome. Meetings normally take place at the North Park Village Nature Center, 5801 N. Pulaski, in Chicago. Parking is free. For more info visit the CTC website: <http://www.geocities.com/~chicagoturtle>.

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